



November 2016

GENERAL USE LEVEL DESIGNATION FOR BASIC (TSS) AND PHOSPHORUS TREATMENT

For
CONTECH Engineered Solutions
Stormwater Management StormFilter®
with PhosphoSorb® media

Ecology's Decision:

1. Based on Contech Engineered Solutions application, Ecology hereby issues the following use level designation for the Stormwater Management StormFilter® using PhosphoSorb® media cartridges:
 - General Use Level Designation (GULD) for Basic Treatment (total suspended solids) and for Phosphorus (total phosphorus) treatment.
 - Sized at a hydraulic loading rate of no greater than 1.67 gallon per minute (gpm) per square foot (sq ft.) of media surface, per Table 1.
 - Using Contech's PhosphoSorb media. Specifications for the media shall match the specifications provided by the manufacturer and approved by Ecology.

Table 1. StormFilter cartridge design flow rates
for 18-inch diameter cartridges with PhosphoSorb
media operating at 1.67 gpm/sq ft.

Effective cartridge height (in)	Cartridge flow rate (gpm/cartridge)
12	8.35
18	12.53
27	18.79

2. Ecology approves StormFilter systems containing PhosphoSorb media for treatment at the cartridge flow rate shown in Table 1, to achieve the maximum water quality design flow rate. Calculate the water quality design flow rates using the following procedures:
 - Western Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using the latest version of the Western Washington Hydrology Model or other Ecology-approved continuous runoff model.
 - Eastern Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using one of the three methods described in Chapter 2.2.5 of the Stormwater Management Manual for Eastern Washington (SWMMEW) or local manual.
 - Entire State: For treatment installed downstream of detention, the water quality design flow rate is the full 2-year release rate of the detention facility.
3. The GULD designation has no expiration date but it may be amended or revoked by Ecology and is subject to the conditions specified below.

Ecology's Conditions of Use:

StormFilter systems containing PhosphoSorb media shall comply with these conditions:

1. Design, assemble, install, operate, and maintain StormFilter systems containing PhosphoSorb media in accordance with applicable Contech Engineered Solutions manuals, documents, and the Ecology Decision.
2. Use sediment loading capacity, in conjunction with the water quality design flow rate, to determine the target maintenance interval.
3. Owners shall install StormFilter systems in such a manner that bypass flows exceeding the water quality treatment rate or flows through the system will not re-suspend captured sediments.
4. Pretreatment of TSS and oil and grease may be necessary, and designers shall provide pre-treatment in accordance with the most current versions of the CONTECH *Product Design Manual* or the applicable Ecology Stormwater Manual. Design pre-treatment using the performance criteria and pretreatment practices provided in the Stormwater Management Manual for Western Washington (SWMWW), the Stormwater Management Manual for Eastern Washington (SWMMEW), or on Ecology's "Evaluation of Emerging Stormwater Treatment Technologies" website.
5. Maintenance: The required maintenance interval for stormwater treatment devices is often dependent upon the degree of pollutant loading from a particular drainage basin. Therefore, Ecology does not endorse or recommend a "one size fits all" maintenance cycle for a particular model/size of manufactured filter treatment device.
 - Typically, CONTECH designs StormFilter systems for a target filter media replacement interval of 12 months. Maintenance includes removing accumulated sediment from the vault, and replacing spent cartridges with recharged cartridges.

- Indications of the need for maintenance include the effluent flow decreasing to below the design flow rate, as indicated by the scumline above the shoulder of the cartridge.
 - Owners/operators must inspect StormFilter with PhosphoSorb media for a minimum of twelve months from the start of post-construction operation to determine site-specific maintenance schedules and requirements. You must conduct inspections monthly during the wet season, and every other month during the dry season. (According to the *SWMMWW*, the wet season in western Washington is October 1 to April 30. According to *SWMMEW*, the wet season in eastern Washington is October 1 to June 30). After the first year of operation, owners/operators must conduct inspections based on the findings during the first year of inspections.
 - Conduct inspections by qualified personnel, follow manufacturer's guidelines, and use methods capable of determining either a decrease in treated effluent flowrate and/or a decrease in pollutant removal ability.
 - When inspections are performed, the following findings typically serve as maintenance triggers:
 - Accumulated vault sediment depths exceed an average of 2 inches, or
 - Accumulated sediment depths on the tops of the cartridges exceed an average of 0.5 inches, or
 - Standing water remains in the vault between rain events, or
 - Bypass during storms smaller than the design storm.
 - Note: If excessive floatables (trash and debris) are present, perform a minor maintenance consisting of gross solids removal, not cartridge replacement.
6. Discharges from the StormFilter systems containing PhosphoSorb media shall not cause or contribute to water quality standards violations in receiving waters.

Applicant:

CONTECH Engineered Solutions

Applicant's Address:

11835 NE Glenn Widing Dr.

Portland, OR 97220

Application Documents:

- The Stormwater Management StormFilter, PhosphoSorb at a Specific Flow Rate of 1.67 gpm/ft², Conditional Use Level Designation Application. August 2012.
- Quality Assurance Project Plan The Stormwater Management StormFilter® PhosphoSorb® at a Specific Flow Rate of 1.67 gpm/ft² Performance Evaluation. August 2012.
- The Stormwater Management StormFilter® PhosphoSorb® at a Specific Flow Rate of 1.67 gpm/ft², General Use Level Designation, Technical Evaluation Report. October 2015.

Applicant's Use Level Request:

- General use level designation as a basic (TSS) and phosphorus (total phosphorus) treatment device in accordance with Table 2 of Ecology's 2011 *Technical Guidance Manual for Evaluating Emerging Stormwater Treatment Technologies Technology Assessment Protocol – Ecology (TAPE)*.

Applicant's Performance Claims:

Based on results from laboratory and field-testing, the applicant claims:

- The Stormwater Management StormFilter® with PhosphoSorb® media operating at 1.67 gpm/ft² is able to remove 80% of Total Suspended Solids (TSS) for influent concentrations greater than 100 mg/L, is able to remove greater than 80% TSS for influent concentrations greater than 200 mg/L, and achieve a 20 mg/L effluent for influent concentrations less than 100 mg/L.
- The StormFilter with PhosphoSorb media is able to remove 50% or greater total phosphorus for influent concentrations between 0.1 to 0.5 mg/L.

Recommendations:

Ecology finds that:

- CONTECH Engineered Solutions has shown Ecology, through laboratory and field testing, that the Stormwater Management StormFilter® with PhosphoSorb® media is capable of attaining Ecology's Basic and Total Phosphorus treatment goals.

Findings of Fact:

Laboratory testing

- A Phosphosorb StormFilter cartridge test unit, operating at 28 L/min (equivalent to 1.0 gpm/ sq. ft.), and subject to SSC with a silt loam texture (25% sand, 65% silt, and 10% clay by mass) originating from SCS 106 provides a mean SSC removal efficiency of 88%;
- A Phosphosorb StormFilter cartridge test unit, operating at 56 L/min (equivalent to 2.0 gpm/sq. ft.), and subject to SSC with a silt loam texture (25% sand, 65% silt, and 10% clay by mass) originating from SCS 106 provides a mean turbidity reduction of 82%;

- Laboratory testing of PhosphoSorb media in a Horizontal Flow Column (HFC; a 1/24th scale of a full cartridge) resulted in 50 percent dissolved phosphorus removal for the first 1,000 bed volumes. Granular activated carbon (GAC) tested under the same conditions resulted in 30 percent removal of dissolved phosphorus.

Field testing

- Contech conducted monitoring of a StormFilter® with PhosphoSorb® media at a site along Lolo Pass Road in Zigzag, Oregon between February 2012 and February 2015. The manufacturer collected flow-weighted influent and effluent composite samples during 17 separate storm events. The system treated approximately 96 percent of the flows recorded during the monitoring period. The applicant sized the system at 1.67 gpm/sq. ft.
 - Influent TSS concentrations for qualifying sampled storm events ranged from 40 to 780 mg/L. For influent concentrations less than 100 mg/L (n=2) the effluent concentration was less than 10 mg/L. For influent concentrations greater than 100 mg/L the bootstrap estimate of the lower 95 percent confidence limit (LCL95) of the mean TSS reduction was 85%.

Total phosphorus removal for 16 events with influent TP concentrations in the range of 0.1 to 0.5 mg/L averaged 75 percent. A bootstrap estimate of the lower 95 percent confidence limit (LCL95) of the mean total phosphorus reduction was 67 percent.

Other StormFilter system with PhosphoSorb media items the Company should address:

1. Conduct testing to obtain information about maintenance requirements in order to come up with a maintenance cycle.
2. Conduct loading tests on the filter to determine maximum treatment life of the system.

Technology Description: Download at: <http://www.conteches.com/Products/Stormwater-Management/Treatment/Stormwater-Management-StormFilter@.aspx>

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Revision History

Date	Revision
December 2012	Original use-level-designation document: CULD for basic and phosphorus treatment.
January 2013	Revised document to match standard formatting
August 2014	Revised TER and expiration dates
November 2015	Approved GULD designation for Basic and Phosphorus treatment
November 2016	Revised Contech contact information